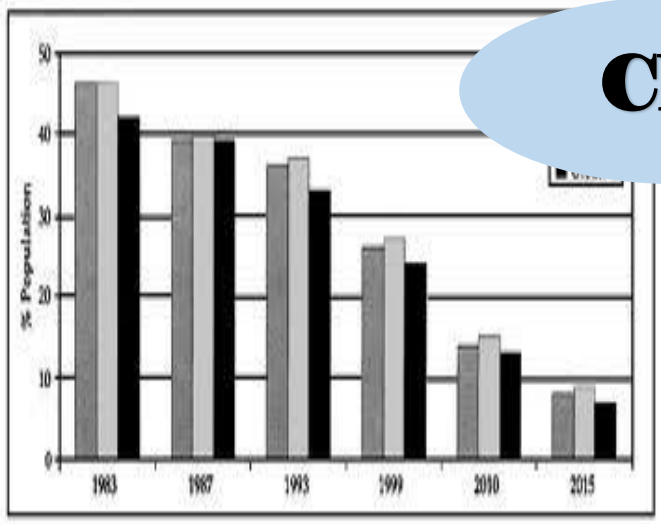
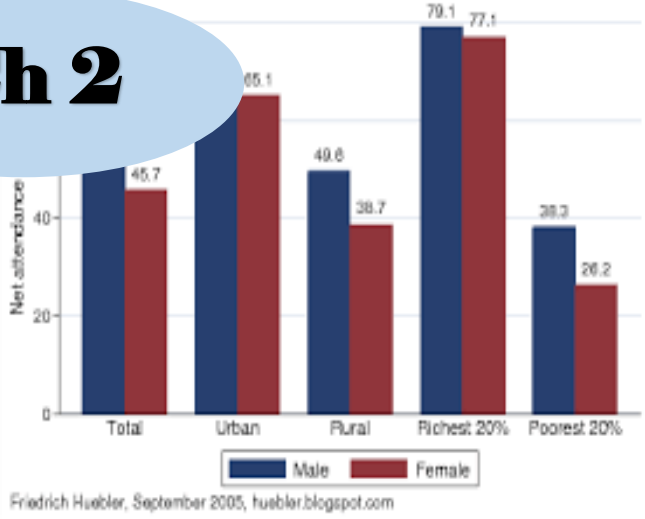
Stat 110

Ch 2





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محمد عمران

السنة التحضيرية

رياضيات واحصاء

0507017098-0580535304

Type of frequency distribution

1-cotegorical frequency distribution

التوزيع التكراري التصنيفي

يستخدم في حاله البيانات الاسمية والترتيبية

يستخدم في حاله الجداول التي تحتوى على بيانات اسميه فقط (الجنسية –فصيلة الدم –النوع)

Nominal- ordinal data

2-un grouped frequency distribution

التوزيع التكراري الغير مبوب

يستخدم في حاله البيانات الكمية ذات المدى القصير

3-grouped frequency distribution

التوزيع التكراري المبوب

يستخدم مع البيانات الكمية ذات المدى الكبير

المدى =أكبر قيمه –أصغر قيمه

Ex

1)Ahmed wants to construct a frequency distribution for major field of college student's .what type of distribution should be used

1-ungrouped 2-grouped 3-categrical

2) 30 students recorded the colors of their eyes choosing from brown, blue, and green and black this data can be approximately summarized in

A-categorical frequency distribution

B-grouped frequency distribution

C-grouped frequency distribution

grouped frequency distribution

التوزيعات التكرارية المبوبة

يستخدم في حاله البيانات الكمية المتصلة ومدى هذه البيانات كبير فتقسم إلى فئات (فترات) ولكل فئة تكرارها

مثل. - أطوال مجموعه من الطلاب وأعمارهم

ملاحظات هامه

1- عدد الفئات يفضل إن يكون من 5إلى 20
2- يفضل إن يكون طول الفئة (class width) عدد فردى
3- الفئات يجب إن تكون متصلة لا يوجد فراغ بين الفئة والفئة التالية
4- طول الفئة يجب إن يكون منتظم (متساوي)

Classes

12-18

تسمى 18-12 الفئة

العدد 12 يسمى النهاية الصغرى للفئة **lower class limit**

العدد18 يسمى النهاية العظمى للفئة **upper class limit**

لكى نوجد حدود الفئة السفلى نطرح خانه عشريه 0.5 من النهاية الصغرى للفئه

Lower boundary 12-.5=11.5

لكي نوجد الحد العلوي للفئة نجمع 0.5 على النهاية العظمى للفئة

Upper boundary 18+0.5=18.5
Then class boundary 11.5-18.5

Class width =upper boundary – lower boundary

طول الفئة = الحد العلوي – الحد السفلى

Class width is 18.5-11.5=7

ملحوظه هامه

لا يمكن الحصول على class width إلا من class boundary

$$\text{Midpoint} = \frac{\textit{lower class limit} + \textit{upper class boundary}}{2} = \frac{12+18}{2} = 15$$

$$\text{Midpoint} = \frac{\textit{lower boundary} + \textit{upper boundary}}{2} = \frac{11.5+18.5}{2} = 15$$

Notes

إذا كانت الفئة بها فاصله عشريه اى الفاصلة بعد رقم نطرح أو نجمع 0.05

مثال 11.5-15.5

Lower boundary =11.5-0.05=11.45
Upper boundary =15.5+0.05=15.55

Ex

1-find class boundary, mid-point and class width for each

A) 56-74

Sol

Lower boundary =56-0.5=55.5

Upper boundary =74+0.5=74.5

Class boundary =55.5-74.5

$$\textit{Mid point} = \frac{55.5 + 74.5}{2} = \frac{130}{2} = 65$$

$$\textit{class width} = 74.5 - 55.5 = 19$$

B) 13.6-14.7

Sol

Lower boundary =13.6-0.05=13.55

Upper boundary =14.7+.05=14.75

Class boundary 13.55-14.75

$$Mid\ point = \frac{13.55 + 14.75}{2} = \frac{28.3}{2} = 14.15$$

$$class\ width = 14.75 - 13.55 = 1.2$$

C) 2.15-3.93

Sol

$$lower\ boundary = 2.15 - 0.005 = 2.145$$

$$upper\ boundary = 3.93 + 0.005 = 3.935$$

$$class\ boundary\ 2.145 - 3.935$$

$$Mid\ point = \frac{2.145 + 3.935}{2} = \frac{6.08}{2} = 3.04$$

$$class\ width = 3.935 - 2.145 = 1.79$$

Frequency

Relative frequency

التكرار النسبي

$$\text{Relative frequency} = \frac{\text{تكرار الفئه}}{\text{مجموع التكرارت}} = \frac{f}{\sum f}$$

$$\text{Percentage} = \frac{f}{\sum f} \times 100$$

Sum of relative frequencies =1

مجموع التكرارات النسبية =1

Sum of percentage frequencies=100%

مجموع التكرارات المئوية =100%

Ex

1-distribution that are used when the proportion of the data is more important than the actual number of the data are know

A-frequency distribution

B-open ended distribution

C-relative frequency distribution

2-the graphs that their distribution as proportions instead of raw data as frequencies are called

A-frequency polygons B-o give graphs

C-histogram d-relative frequency graph

3-expect for rounding error, relative frequency should add up to

A-0 b- 1 c- 50 d-100

for the following table

Blood type	A	B	O	AB
Frequency	5	7	9	4

1-The sample size is

a-60 b-25 c-30 d-100

2-the percentage of blood type O is

a-36% b-20% c-30% d-16%

3-the relative frequency of blood type A

a-0.45 b-0.28 c-0.16 d-0.2

Sol

1-sample size=5+7+9+4=25

2- percentage O== $\frac{9}{25} \times 100 = 36\%$

$$3 - relative\ frequency A = \frac{7}{25} = 0.28$$

The of observation in a class is called a (an) ……in a categorical frequency distribution

a-interval b- category c-frequency d-midpoint

the blood types of eight students are O,O ,B ,A, A ,AB , O and AB .what are these ungrouped data called?

a-raw data b-category c-class frequency d-relative frequency

1-what is the lower class limit in the class 13-17 ?

a-13 b-17 c-12.5 d-17.5

2-the lower boundary in class 13-17

a-13 b-17 c-12.5 d-17.5

3-class midpoint in class 13-17

a-13 b-15 c-12.5 d-17.5

4-the class width for the class 5.1-8

a-3.1 b-3 c-6.55 d-2.9

5-the class midpoint for the class limit 5.1-8

a-6.5 b-7.2 c-6.55 d-3

6-in frequency distribution , the number of classes should be between

a-5and 20 b-10and20 c-10and 25

7-if frequency distribution has class boundaries of 23.4-28.4, what would be the class width?

a-5 b-6 .3 c-5 .1 d-8

sol

1-lower limit 13

2-lower boundary 13-0.5=12.5

3-mid point $=\frac{13+17}{2}=\frac{30}{2}=15$

4) lower boundary =5.1-.05=5.05

Upper boundary = 8+0.05=8.05

Class width =8.05-5.05=3

5)$mid\ point=\frac{5.1+8}{2}=\frac{13.1}{2}=6.55$

6) 5 and 20

7) class width =28.4-23.4==5

Graphs

Histogram

المدرج التكراري

يستخدم لوصف الكميات المتصلة وهو عبارة عن أعمده رأسيه

المحور الافقى x-axis يمثل حدود الفئة class boundary

المحور الرأسي y-axis يمثل التكرار frequency

The frequency polygon

المضلع التكراري

المحور الافقى x-axis يمثل midpoint

المحور الراسي y-axis ويمثل عليه frequency

ونصل بين النقاط

The ogive graph (cumulative frequency graph)

المنحنى التكراري المتجمع الصاعد

المحور الافقى x-axis نمثل عليه class boundary

المحور الراسي y-axis نمثل عليه التكرار المتجمع الصاعد cumulative frequency

Ex

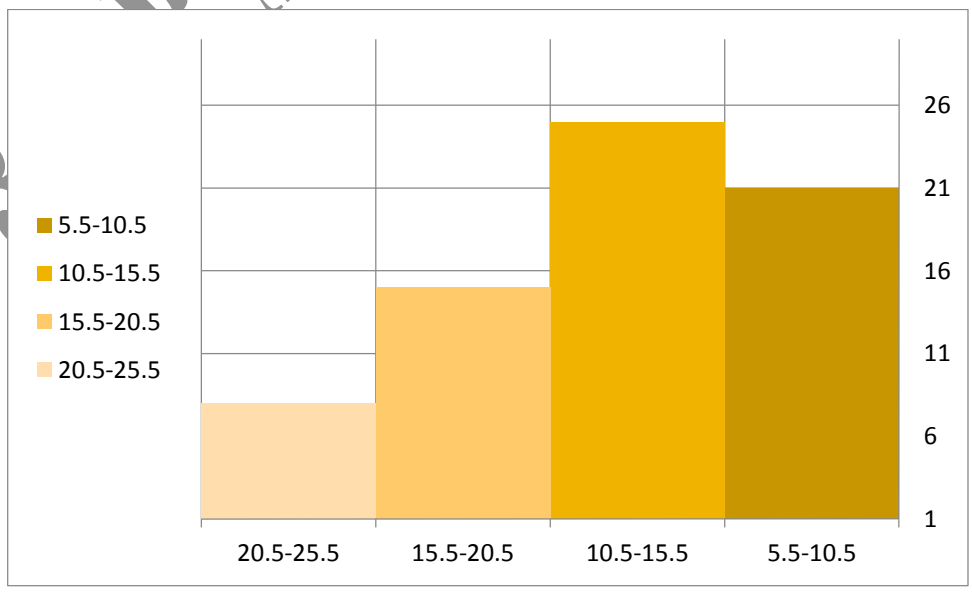
Construct a histogram , frequency polygon and ogive for the data show

Class limits	Frequency
1-5	21
6-10	25
11-15	15
16-20	8

Solution

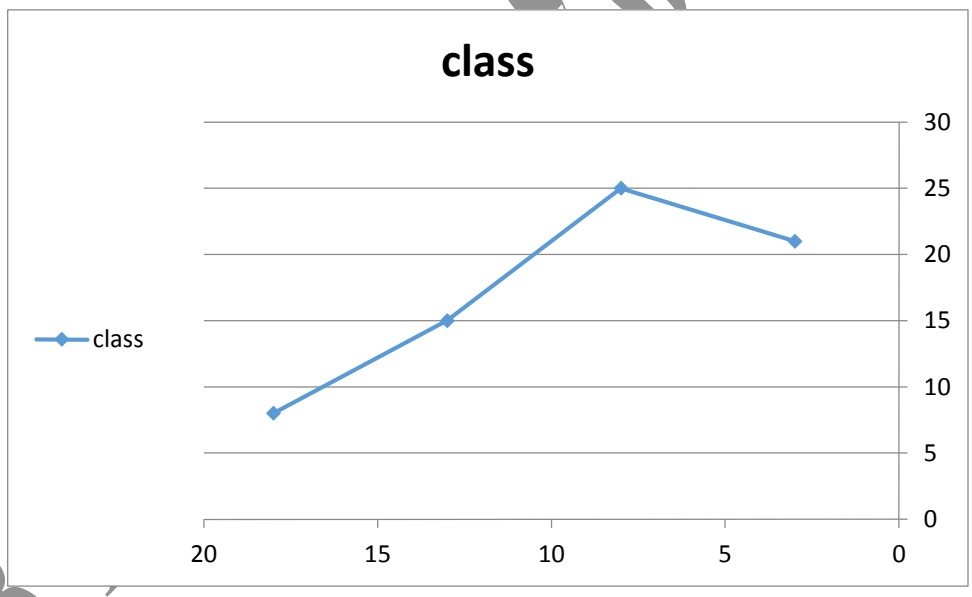
Histogram

Class boundary	Frequency
0.5-5.5	21
5.5-10.5	25
10.5-15.5	15
15.5-20.5	8



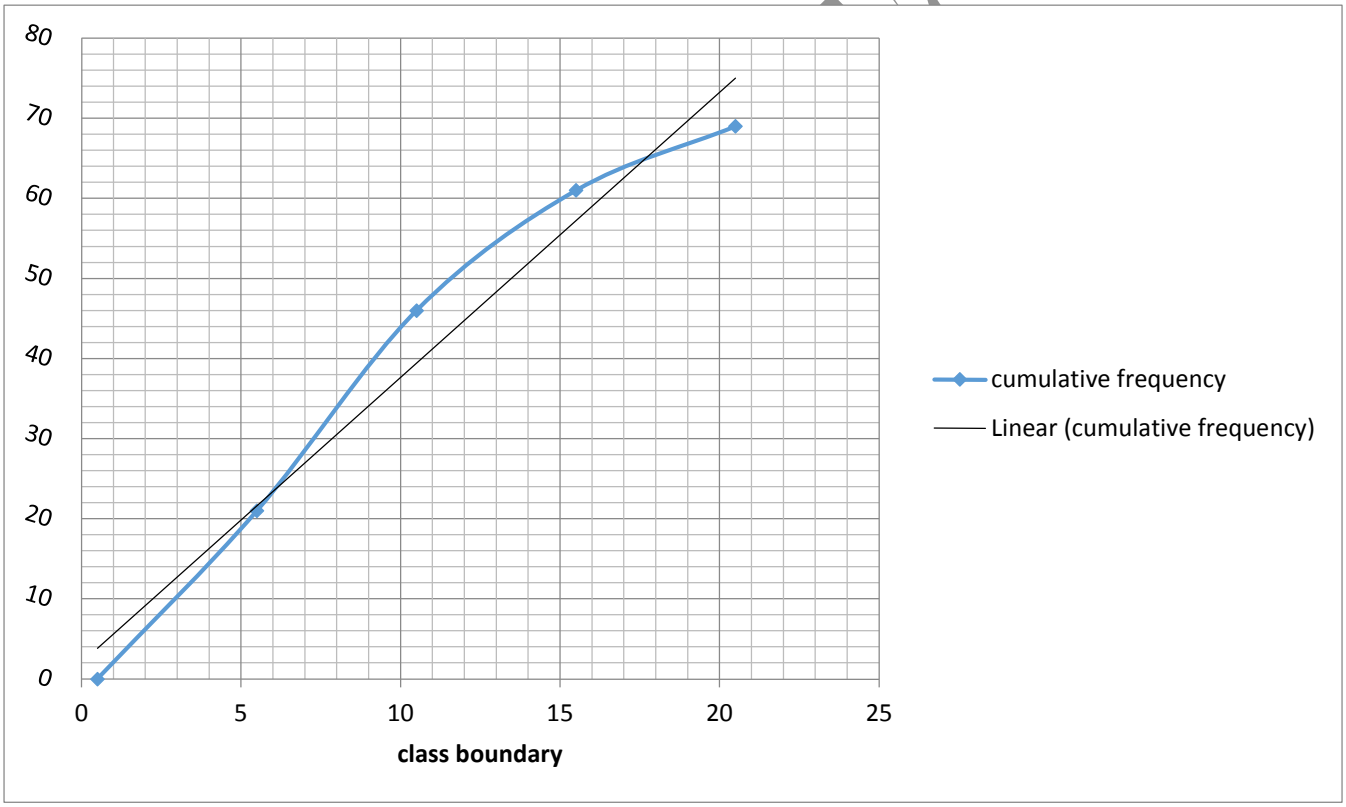
Polygon

Midpoint	Frequency
$\frac{1+5}{2}=3$	21
$\frac{6+10}{2}=8$	25
$\frac{11+15}{2}=13$	15
$\frac{16+20}{2}=18$	8



O give

Class boundary	Cumulative frequency
Less than 0.5	0
Less than 10.5	0+21=21
Less than 15.5	21+25=46
Less than 20.5	46+15=61
Less than 25.5	61+8=69 total frequency



Summry

Class limit	Class boundary	Frequency	Relative frequency	Cumulative frequency	Cumulative relative frequency
1-5	0.5-5.5	21	0.30	21	0.30
6-10	5.5-10.5	25	0.36	21+25=46	0.30+0.36=0.66
11-15	10.5-15.5	15	0.23	46+15=61	0.66+0.23=0.89
16-20	15.5-20.5	8	0.11	61+8=69	0.89+.11=1
Total			1		

Ex

1-histogram is suitable for represent in ……data

a-ordinal b-continuous c-nominal d-qualitative

2-which type of graph represent the data by using vertical bars of various height to indicated frequency ?

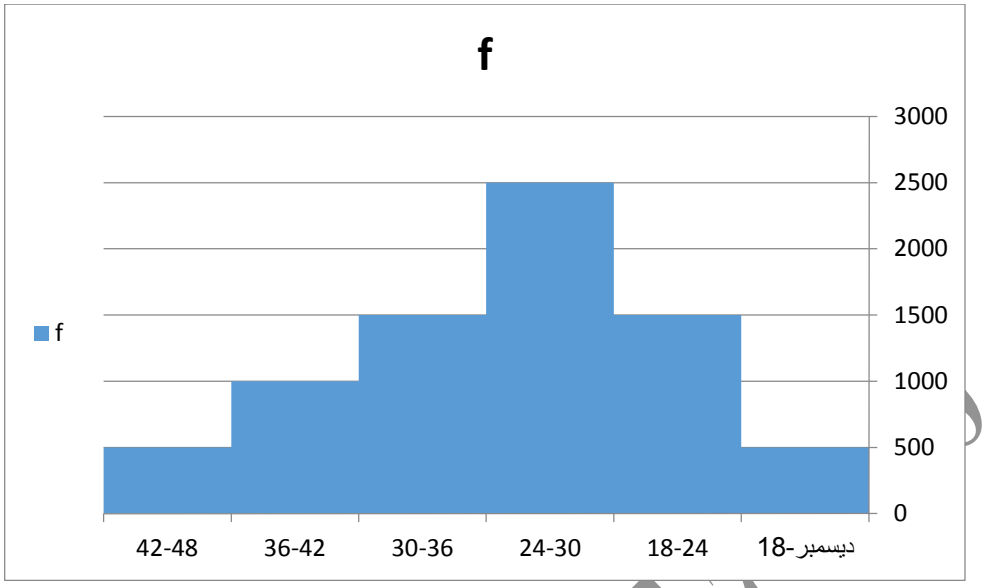
a-histogram b-ogive c-frequency polygon d-cumulative frequency

3-the……is the assume of frequencies accumulated to upper boundary of class in the distribution

a-frequency polygon b-cumulative frequency c-relative frequency

4-the graph that represents the cumulative frequencies for the class in a frequency distribution is called a(an)

a-ogive b-time series c-histogram d-bar chart



In above graph ?

1-what type of this graph

a-ogive b-pie chart c-perto chart d-histogram

2-the class that has height frequency

a-24-30 b-30-36 c-12-18 d-18-24

3-the class with frequency1000 is

a-24-30 b-36-42 c-12-18 d-18-24

4-the total frequency of the data shown

a-6000 b-8000 c-7500 d-12000

Class boundary ages	Frequency number of student
13.5-18.5	4
18.5-23.5	9
23.5-28.5	12
28.5-33.5	15
33.5-38.5	17

Given the following distribution

1-number of students where age is less than 23.5 is

a-4 b-9 c-13 d-5

1)9+4=13

2-number of students where age is less than33.5

a-15 b-57 c-40 d-25

2) 12+9+4=25

---

the number of patient in the waiting rooms. With in a hospital at a specific time are given by the following frequency distribution

Number of patient	1	2	3	4	5	Total
Frequency	3	5	11	?	4	32

1-that can be best represent graphically by

a-frequency polygon b-histogram c-time series graph d-bar chart

2-the missing frequency for the following class is

a-10 b-7 c-9 d-8

2) 32-(3+5+11+4)=9

3-the sample size is

a-30 b-15 c-32 d-5

4) 3+0.5=3.5

4-the upper class boundary for the third class is

a-3.5 b-11.5 c-10.5 d-2.5

5-the percentage of the number waiting rooms that have 3 patient

a-12.5% b-13.33% c-36.67% d-34.37%

$$5)\ \frac{11}{30}\times 100 = 36.67\%$$

Grades boundary	44.5-49.5	49.5-54.5	54.5-59.5	59.5-64.5	64.5-69.5
Cumulative frequency	6	18	42	58	79

Use the data given to answer

1-the frequency of the third class

a-66 b-42 c-16 d-24

2-the class limits for the second class boundary is

a-50-54 b- 49-54 c - 50-55 d- 49-55

3-the class midpoint of the fourth class

a-58 b-62 c -91.75 d- 29

4-the sample size is

a-79 b-cannot determined c- 203 d- 5

5-what is the value of the highest cumulative frequency ?

a-69 b- 79 c-cannot determined d-1

6-what is the percentage of students who have marks of at least 55 ?

a-77.22% b-46.84% c-30.38% d-88.18%

7-what is the class width ?

a-12 b-6 c-4 d-5

8-the best graph for representing the data shown in the previous table is called

a-time series graph b-frequency polygon c-histogram d- ogive

sol

1) 42-18=24

2) 49.5+.5=50 ,54.5-0.5=54 class limit 50-54

3) $Mid\ point = \frac{59.5+64.5}{2} = 62$

4) 79

5) 79

6) $100 - \left(\frac{18}{79} \times 100\right) = 77.22\%$

7) 49.5-44.5=5

Other types of graph

1-apareto chart

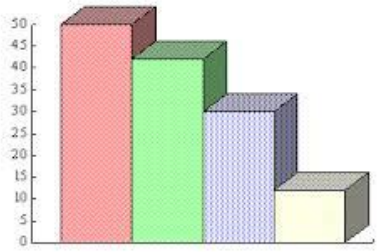
Is used to represent a frequency distribution for a categorical variable

يستخدم في المتغيرات الوصفية

خطوات الرسم

1-نجعل الأعمدة متساوية في عرضها

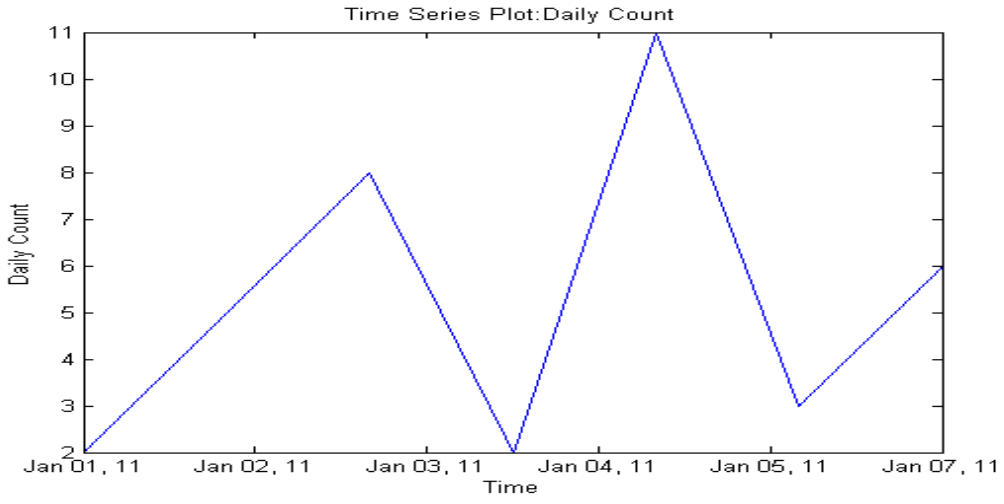
2-نرتب البيانات من التكرار من الاكبر الى الاصغر



2-a time series graph

Represent data that occur over a specific period

وهو يمثل البيانات التي تحدث في فتره زمنيه



3-a pie graph

وهي دائرة تقسم الى قطاعات كل قطاع حسب النسبة المئوية للتكرار

The purpose of the pie graph is to show the relationship of the parts to the whole

We use a pie graph with nominal variable or categorical variable

$$\text{Degree} = \frac{f}{\sum f} . 360$$

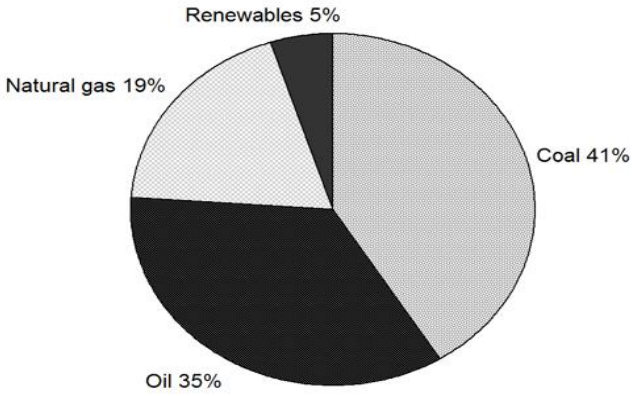
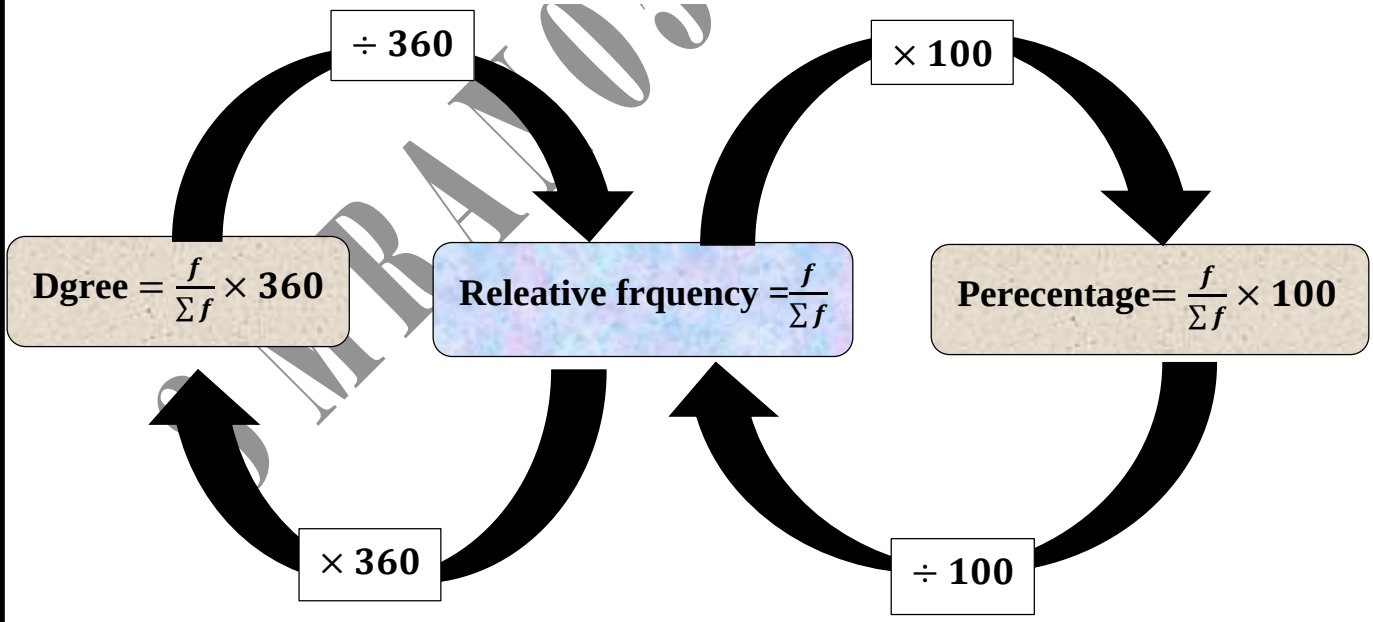


Figure 1. The source of energy consumed in Australia in 2005-06



Example

1-on a petro chart the frequencies should be represent on the
A)x-axis b)y-axis

2-what is the other name for the o give
a)histogram b)frequency polygon c)cumulative frequency graph

3-data collected over period can be organized into
a)time series b)pie graph c)histogram

4-what graph should be used to show the relationship between the parts and the whole
a)histogram b)pie graph c)o give

5-in a pie graph if a pepperoni pizza were 24/72 of the distribution , how many degree be needed to represent a pepperoni
a)120 b)60 c)90 d)150

$$\frac{24}{72} \times 360 = 120$$

6- in a pie graph if the blood type O was 36% of the distribution, how many degree would be needed to represent type O?
a)120 b)129.6 c)1296 d)360

$$\frac{36}{100} \times 360 = 129.6$$

7-in a pie graph if the blood type O represent by 90 , then the relative frequency of the blood type O
a)0.43 b)0.5 c)0.18 d)0.25

$$\frac{90}{360} = 0.25$$

8-an automobile dealer want to construct a pie graph to represent type of cars sold in July .he sold 72 cars, 16 of which were convertibles the convertibles will represent , how many degree in the circle
a)100 b)60 c)50 d)80

$$\frac{16}{72} \times 360 = 80$$

the following table represent the favorite car make for a group of student

Class	Toyota	Nissan	Chevrolet	GMc	Honda
Frequency	20	15	13	12	18

1-the sample size is

A)60 b)18 c)5 d)78

20+15+13+12+18=78

2-if a pie graph is used to represent the data , the degree for G M C brand would be

a)0.15 b)55.38 c)0.55 d)15.38

$\frac{12}{78} \times 360 = 55.38$

3-the percentage of students who like Nissan is

a)30% b)25% c)19.23% d)83.33%

$\frac{15}{78} \times 100 = 19.23\%$

4-the cumulative frequency for the third class is

a)13 b)48 c)35 d)43

20+15+13=48

5-the type of data

a)discrete b)continuous c)nominal d)variable

A stem and leaf plot

هو رسم بياني يستخدم جزء من البيانات لتمثيل الورقة leaf (وهي خانه الآحاد) والجزء الباقي يمثل الساق (stem)

Definition

A stem an leaf plot is the graph that retains the actual data while they in a graphic form

Ex

Construct a stem and leaf plot for the data
25, 13,31,20,32,14,43,2,57,23
Solution

نرتب البيانات ترتيب تصاعديا

2,13,14,20,23,25,31,32,43,57

Stem	Leaf
0	2
1	3 4
2	0 3 5
3	1 2
4	3
5	7

What the stem and leaf of 45
a)stem 5 leaf 4 **b)stem 4 leaf 5**

what is the stem and leaf in 127
a)stem 1 leaf 27 **b)stem 12 leaf7**
c)stem27 leaf1 **d)stem 7 leaf 12**

the……..is a method of organizing data and it is a combination of sorting and graphing
a)pie graph **b)stem and leaf plot**

test bank

1. **The following data represent the fire in the week for 4 cities. Choose the correct frequency distribution to organize the data**

A

Class Limit	Frequency
4-7	2
7-10	3
10-13	6
15-18	8

b

Class Limit	Frequency
4-7	2
8-11	5
12-15	9
16-19	2

c

Class Limit	Frequency
4-7	2
7-11	3
11-14	6
14-17	8

d

Class Limit	Frequency
4-7	2
7-10	3
10-13	1
13-16	5

2. What are the boundaries of 49.005 ounces?

a) 49-50 ounces b)48.505-49.505 ounces c)49.0045-49.0055 ounces

3.The class width for the class 28-33 is

a) 5 b)6 c)33 d)28

The following table shows the frequency distribution of temperature (in degree centigrade) of 30 countries :

Class Limit	Frequency
30-34	10
35-39	5
40-44	8
45-49	7

Use the above table to answer questions(4-6)

4.The number of countries with temperature less than 44.5 is

a) 8 b) 10 c) 3 d) 23

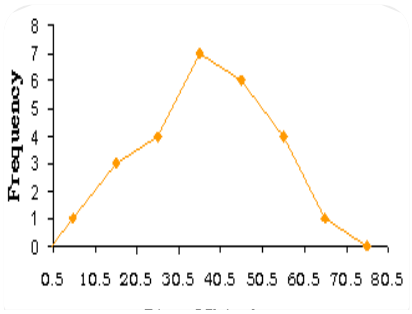
5.The percentage of values in second class is :

a) 33.33 b)16.67 c)0.1667 d)0.2667

6. The midpoint in the first class is:

a) 32 b)32.5 c) 37 d) 64

Use the following graph to answer the question (1-3)



1.The graph has ……peak

a) Four b) one c) three d) two

2.Type of graphs is:

a) Frequency polygon b) ogive c)cumulative frequenc

3. Other name for ogive is:

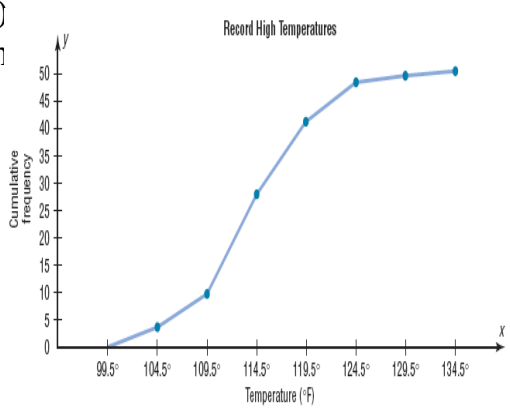
a) Histogram

b) Frequency Polygon

c) Cumulative frequency graph

d) Pareto Chart

From the ogive below, answer (4-5)



4. Approximately what is the total number of observation

a) 222

b) 50

c) 8

d) 134.5

5. How many records high temperature are less than

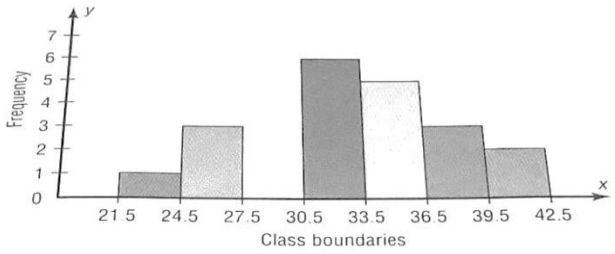
a) 50

b) 40

c) 28

d) 10

Using the histogram shown here, do the following :



6. How many values less than 33.5 ?

a) 0
b) 14
c) 10
d) 16

7. How many classes in the above chart ?

a) 7
b) 6
c) 12
d) 4

8. The class width is ….

a) 4 b) 3 c)5 d)2

9. What graph should be used to show the relationship between the parts and the whole ?

a) Histogram
b) Pie graph
c) Pareto graph
d) Ogives

10. Data collected over period of time can be graphed using ……..graph

a) Pareto graph
b) Pie graph
c) Time serious
d) Curve

11. Percentages can be used in which type of graph…

a) Histogram
b) Pareto chart
c) Pie graph
d) Ogive

12. A researcher wishes to represent the percentage of students in the department of statistics using a pie graph. If the percentage of statistical department students is 25%, then their corresponding degree of the angle on the pie graph is .....

a) 300
b) 1080
c) 900
d) 1800

13. In a stem and leaf plot, the stem part for the data value 347 is .....

a. 34
b. 7
c. 47
d. 3

14. A department store wants to construct a pie graph to represent the marital status (الحالة الاجتماعية) of its employees. There were 30 married , 10 divorced, 20 singles and 5 widows. How many degrees will be needed to represent the divorced(المطلقات) employees?

a) 41.6^0
b) 10^0
c) 55.38^0
d) 15.4^0

15. When data are collected from January to December in year 2011 , then they can be represented by

a) Histogram
b) Pie graph
c) Time series
d) Pareto chart

16. The heights of vertical bars in the histogram represent the ……..

a) Class width
b) Sample size
c) Frequencies of classes
d) Number of classes